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Diseases, Insects, Pests
Alberta AGRICULTURE

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Warble Control in Alberta

The warble is a major economic pest of cattle in Alberta. Warble grubs, which are the larval stage of the "heelfly", spend over nine months in cattle as internal parasites. During this period they damage the meat and hide of infested animals and are responsible for reduced milk production in lactating cattle and lower weight gains in calves. Both cattlemen and packers incur severe economic losses in the absence of a warble management program. In Alberta, there is a province-wide organized warble control program helping Alberta cattlemen and the packing industry. According to the Agricultural Pest Act, all Alberta producers must take active measures to control warbles in their cattle. To manage warbles at the farm level, it is necessary to understand the biology of the insect and the method of action of the various pest control products.

Warble flies and their life cycle

Warble flies develop from the grubs that drop from cattle in the spring. The flies, which are rarely seen, resemble small bumble bees. The flies are active on sunny days. They do not bite or sting, but their egg laying activity causes cattle to panic. Warble flies will chase cattle into water or shade.

There are two species of warble fly in Alberta: common and northern. The female adult of the common cattle grub lays groups of eggs on the lower portions of cattle from May to June. The northern cattle grub adults (heel or gad flies) dart at the animals, attaching single, barely visible eggs on the legs above the hoofs. This egg laying action causes cattle to run with their tails in the air, commonly called "gadding". Each adult fly can lay 400 to 800 eggs.

Tiny larvae hatch from the eggs in two to seven days and crawl to the base of the hair where they burrow through the skin into the animal's body.

The larvae wander through the animal's tissue during the fall and winter, reaching the back of the animal in the spring. It is during this early migratory stage that the grubs are most susceptible to control with systemic insecticides. While moving through the animal, the common cattle grubs move into the esophagus, while the northern cattle grubs tend to gather around the spinal cord. Using systemic insecticides on animals with grubs in these areas may result in side reactions; consequently, treatment is not recommended in December, January or February. The grubs reach the back in March or April (depending on the species and the area of the province), cut breathing holes through the hide and remain there for four to 10 weeks. They then crawl out of the hole, fall to the ground and pupate during April, May or June. The adults emerge from the pupae in one to three months and begin laying eggs from late April through September.

Economic importance

The warble fly causes economic losses to the cattle producer during all stages of its life cycle, except the pupal stage.

The major direct losses to the livestock producer result from reduced weight gain and milk production, caused by cattle gadding and grub movement through the animal's body.

Gadding in the herd reduces the gains that cattle can make on pasture. It may reduce milk production by 1.1 kg (2.5 lb) per day. Weaning weights may fall by 20 kg (44 lb). Yearling gains on pasture may be reduced by as much as 25 kg (55 lb). This represents a loss of $40 - 50 per calf and about $45 per yearling steer on an infested pasture.

Wintering steers at the Lethbridge Research Station gained 0.1 kg (0.22 lb) more per day when treated. Over a 180 day period this represents an extra 18 kg (39 lb) per steer. At $1.90 per kg ($0.86 per lb) this means an extra $33.54 per treated steer in the spring.

In the feedlot, animals treated with systemics insecticides gained an extra 10 kg (22 lb) in four months. This amounts to over $15 per head at 1991 prices.

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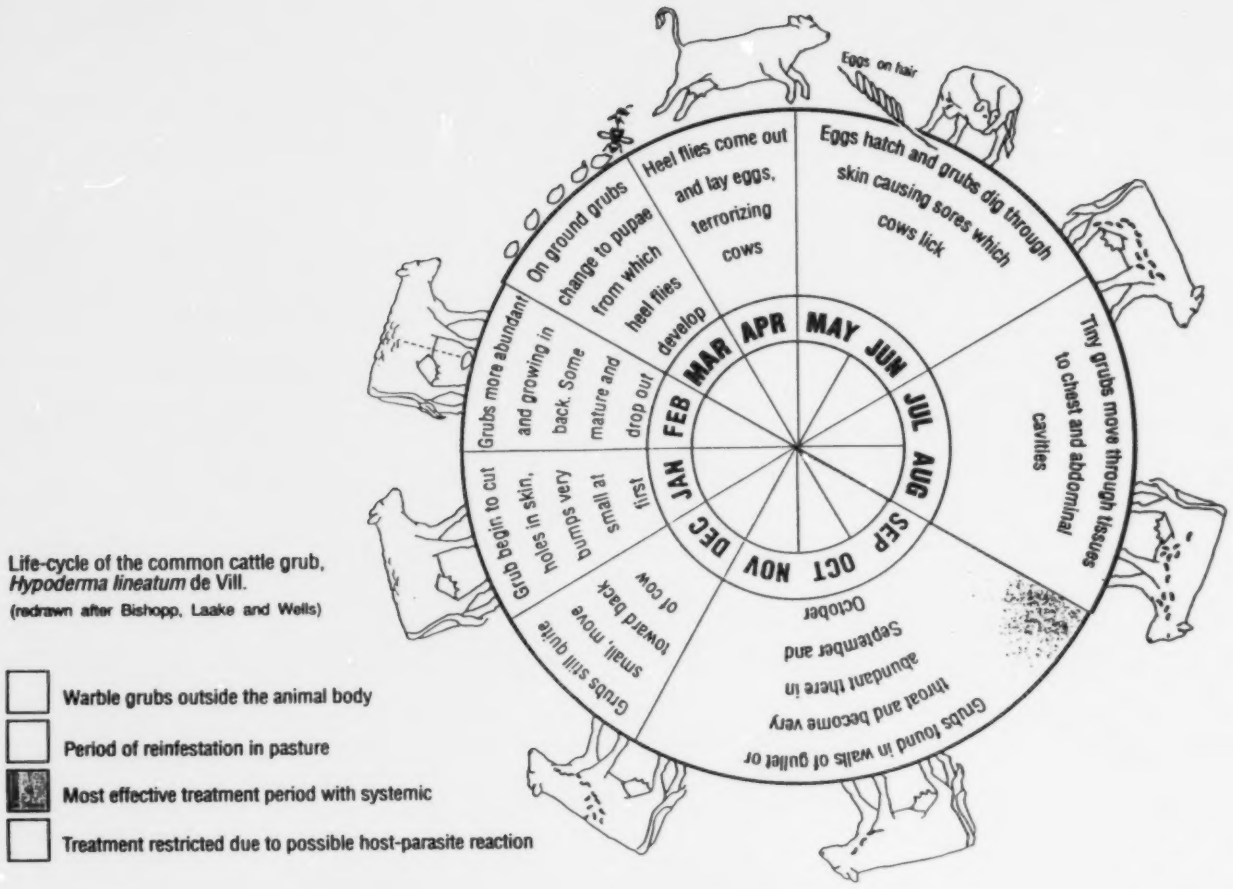
Eggs on hair
Eggs hatch and grubs dig through skin causing sores which cows lick
Tiny grubs move through tissues to chest and abdominal cavities
Grubs found in walls of gullet or throat and become very abundant there in September and October
Grubs still quite small, move toward back of cow
Grub begin to cut holes in skin, pumps very small at first
Grubs more abundant and growing in back. Some mature and drop out
On ground grubs change to pupae from which heel flies develop
Heel flies come out and lay eggs, terrorizing cows
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
Warble grubs outside the animal body
Period of reinfestation in pasture
Most effective treatment period with systemic
Treatment restricted due to possible host-parasite reaction

Life-cycle of the common cattle grub, *Hypoderma lineatum* de Vill.
(redrawn after Bishopp, Laake and Wells)

Figure 1. Life-cycle of the common cattle grub.

At the market, packers have to trim 1 - 3 kg (2.2 - 6.6 lb) off an infested carcass to remove the grubs. About 10 per cent of the hide is damaged in the prime back area. A carcass disfigured as a result of being trimmed for warbles does not keep well in storage and is discounted by $0.11 per kg ($0.05 per lb) by the wholesaler. Altogether, these losses can add up to over $43 per infested carcass.

The total losses

In 1980 the losses due to warble flies and their grubs were estimated at $6.0 million in Alberta alone. Most of the warbles were found in herds of the 10 per cent of producers who did not treat their cattle regularly. This represented a loss of $1,350 in each of these herds; a loss that could have been prevented with $100 worth of insecticide in the fall.

Systemic insecticides for warble control

Warble flies and their larvae (cattle grubs) are declared pests under The Agricultural Pests Act. It is the responsibility of every livestock producer to control these pests for his own benefit as well as the benefit of neighbors and the livestock industry.

Warble grubs are one of the easiest pests to control when they are captured in the animal during the fall and winter months. Using systemic insecticides is an inexpensive and effective way to control warbles. These insecticides when applied to the animal's skin are absorbed into its blood stream, killing grubs wherever they are in the animal.

Louse control is an extra benefit of treating cattle in the fall with systemic warble control products. All actively feeding lice will be controlled when the systemic is applied as a pour-on or spot-on in the fall. This prevents the heavy build-up of lice in the colder months of December, January and February. It was demonstrated that 67 per cent of the animals that were treated for warble grubs with a systemic insecticide remained louse-free and the remaining 33 per cent had light to moderate infestations. Total coverage of the animal with a high pressure spray using Co-Ral will also provide a residue that will control louse eggs as they hatch. This treatment should be considered in herds with a history of louse problems.

A second treatment with a systemic pour-on product for warble control will help to control lice that develop later in the winter. However, cattle not treated for warbles in the fall may carry grubs in the area around the gullet and spinal column later in the winter. These grubs may react to treatment with a systemic and cause swellings which sometimes result in bloat or paralysis.

Fall insecticide treatment

The weak link in the life cycle of the warble occurs when the grubs are in the cattle. Fall is the best time to treat, since grubs are killed before they cause major damage. Cattle can be treated with systemic insecticides from mid-September to December 1 in Alberta. Cattle should not be treated in December, January, or February because side reactions caused by the death of the grubs can occur.

Spring Insecticide Treatment

Spring treatment is a clean-up treatment and should not be considered as the producer's primary control program. Cattle can be treated with systemics after March 1. Milking dairy animals can only be treated in the spring using rotenone, which is sprayed or scrubbed into the open holes in the back at three-week intervals during March, April and May. With spring application of systemics, between 95 and 100 per cent of the grubs will be controlled if infested cattle are treated between March 1 and April 15, with reduced control thereafter. In late spring, a systemic insecticide sprayed directly into the warble opening will act both as a systemic and a contact insecticide and probably provides better control than other applications of systemics. Rotenone provides good spring grub control if it is applied properly.

Treatment methods

Each kind of warble control insecticide is applied differently. The following notes related to the various application methods may assist in obtaining good grub control.

Spraying with Systemic Insecticides

- The animal must be wet to the skin.
- Spray animals individually or in groups of eight to 10 in a small pen
- Spray animals in well ventilated areas.
- Apply 4.5 litres (1 gallon) of spray/animal (small animals may require less).
- Better application is required when animals have thick long winter hair.
- Use a pressure of 2415-2760 kPa (350-400 psi) and a gun fitted with 1.6 or 2 mm (4/64 or 5/64 in.) discs. A spray that is too coarse will splash off the animal and be wasted.
- Stand upwind when applying the pesticide.
- Wear a respirator and other appropriate protective equipment as recommended on the label.

Spraying with Contact Insecticides

- Spray in spring at three-week intervals when warble holes are open.
- Spray at a pressure of 2760 kPa (400 psi) keeping the nozzle 30 to 45 cm (12 to 18 inches) from the warble holes in the animal's back.
- Use a single-nozzle gun fitted with a 2 mm (5/64 inch) disc.
- Spray animals individually applying 2.3 litres (1/2 gallon) on the back of each animal.

Pour-On

- Apply the proper dose along the spine in a thin stream.

Spotton

- Apply the proper dose to a single spot on the hip of each animal.
- Eliminate any air pockets in the tube leading to the gun-type applicator or the animal will be undertreated.
- Replace or repair any worn parts of the applicator.

Warning when using insecticides

Read and follow label directions each time you use an insecticide, since doing so will protect you against loss or damage that may result. Wear the appropriate safety equipment when treating livestock; remember, if it can enter the animal's body, it can enter yours.

Table 1. - Insecticides for control of warbles in Alberta (beef and non-lactating dairy cattle*)

Technical name	Brand name	Dosage	Method of application	Wait period to slaughter	Wait period to freshening
Coumaphos	Co-Ral	4.5 L (1 gal) 0.5% spray per animal	High-pressure spray	7 days	14 days
Famphur	Warbex	Inject 4.4 ml intramuscularly 100 kg body weight using sterile syringe with a 2 cmlong 16-18 gauge needle.	Injectable – drug	42 days	Do not administer to dairy cattle of breeding age
Fenthion	Spotton	for animals weighing: 67.5 - 135 kg (150 - 300 lb) 4 ml 136 - 270 kg (301 - 600 lb) 8 ml 271 - 405 kg (601 - 900 lb) 12 ml 406 - 540 kg (901 - 1200 lb) 16 ml over 540 kg (over 1200 lb) 20 ml	Spot-on	45 days	10 days
Ivermectin	Ivomec (Injectable)	Administer by subcutaneous injection 200 ug/kg body weight (maximum 10 ml/ injection site) under the loose skin in front or behind the shoulder using a sterile 16 gauge, 15-20 mm needle.	Injectable drug	49 days	60 days prior to calving
	Ivomec (pour-on)	Apply along the back line of the animal in a strip extending from the withers to the tail head at an application rate of 1 ml for 10 kg body weight.	Pour-on	49 days	*Not for use in female dairy cattle of breeding age
Trichlorfon	Neguvon, Epco, Grubex Trichlorfon	14 ml/45 kg body weight to a maximum of 112 ml animal 1/2 oz/100 lb body weight	Pour-on	21 days	7 days
Rotenone	Derris Nicouline, Tubatoxin	0.5 L (1 pint) 0.25% Rotenone + 25% soap/animal OR 2.2 L (2 quarts) of 0.5% suspension/animal	brush-on every 3 weeks before warbles drop OR high-pressure spray	—	—

NOTE: Not all "BRAND NAME" products in Alberta are listed. Check with your local livestock supply outlets for other available products.

Protect your animals

Note and observe the following

- Do not treat animals with systemics during December, January, or February.
- Observe the wait-periods between treatment and slaughter or milking.
- Do not treat milking dairy cattle with systemic insecticides. Dry cows may be treated with a systemic product.
- If cows freshen before the required wait-period is over, discard the milk for the remainder of the wait-period.
- Do not overly excite the animals before, during and after treatment.
- Do not spray hot, tired animals immediately after they are corralled.
- Do not spray during cold weather unless the animals have a protected place in which to dry before nightfall.
- Do not treat animals under stress due to shipping, dehorning, branding, disease, etc.
- Do not treat animals within 10 days of weaning.
- With most systemics it is recommended that animals under three months of age not be treated.
- Allow animals free access to water and an exercise area after treatment.
- Treat late-stage pregnant cows after calving to reduce the chances of mechanical injury to the animal.
- Watch the treated animals for signs of side reactions especially during the first 72 hours after treatment and call a veterinarian if any problems arise.

If an animal reacts to a treatment

- Call a veterinarian as soon as signs of any side reactions appear (stiffness, staggering, convulsions, diarrhea, slobbering).
- If an animal dies, have a regional veterinarian or local practitioner perform an autopsy.
- Inform your local agricultural fieldman and the manufacturer of the insecticide of your problem.

If the insecticide has been applied properly and all restrictions have been observed, losses will be minimal and compensated for by Alberta Agriculture, provided a veterinarian's report confirms the diagnosis.

For further information contact

- your local agricultural office
- your local veterinarian
- the dealer or manufacturer of the product
- the Animal Management Section of Alberta Agriculture.

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